

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
23 February 2006 (23.02.2006)

PCT

(10) International Publication Number
WO 2006/020913 A3

- (51) International Patent Classification:
E21B 23/00 (2006.01) *C21D 9/08* (2006.01)
E21B 17/00 (2006.01)
- (21) International Application Number:
PCT/US2005/028819
- (22) International Filing Date: 11 August 2005 (11.08.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/600,679 11 August 2004 (11.08.2004) US
- (71) Applicant (for all designated States except US): EN-
VENTURE GLOBAL TECHNOLOGY, LLC [US/US];
15995 North Barkers Landing, Suite 350, Houston, TX
77084 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): BRISCO, David
Paul [US/US]; 405 Westridge Drive, Duncan, Oklahoma
73533 (US). WATSON, Brock Wayne [US/US]; 2535
Marsh Lane, # 1004, Carrollton, Texas 75006 (US).

SHUSTER, Mark [US/US]; 19115 Prospect Lane, Hous-
ton, Texas 77094 (US). GRAY, Malcolm [US/US]; 1502
Wagon Gap Trail, Houston, Texas 77010 (US). GRIN-
BERG, Grigoriy [US/US]; 4758 Mount Airy, Sylvania,
Ohio 43560 (US). COSTA, Scott [US/US]; 25614 Broad-
crest Court, Katy, Texas 77494 (US). WASSON, Russell
[US/US]; 2647 Highway J, Bourbon, Missouri 65441
(US).

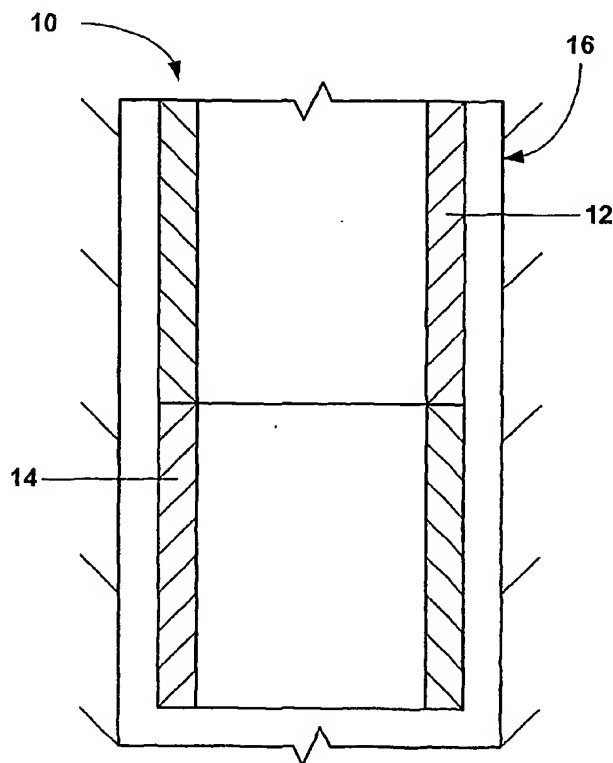
(74) Agents: HAYNES AND BOONE LLP et al.; 901 Main
Street, Suite 3100, Dallas, Texas 75202 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,
MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ,
OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL,
SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC,
VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: METHOD OF MANUFACTURING A TUBULAR MEMBER

(57) Abstract: A method
of manufacturing a tubular
member.



WO 2006/020913 A3



(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:

28 September 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/28819

A. CLASSIFICATION OF SUBJECT MATTER

IPC: E21B 23/00(2006.01),17/00(2006.01);C21D 9/08(2006.01)

USPC: 166/380,382,207,242.1;148/593

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 166/380, 382, 207, 242.1; 148/593

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X, E | US 2005/0217768 A1 (ASAHI et al) 06 October 2005 (06/10/2005) (see the entire patent, in particular Paragraphs [0005], [0052]-[0078], [0090]-[0113], and Tables 1-3). | 1-23 |
| X | US 6,543,552 B1 (METCALFE et al) 08 April 2003 (08/04/2003), see tubular member 18 having one or more intermediate characteristics in Figures 1-5 and one or more final characteristics in Figures 6-7. | 1-7 |
| A | US 3,785,193 A (KINLEY et al) 15 January 1974 (15/01/1974), see figures 1-3. | 1-7 |

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

30 April 2006 (30.04.2006)

Date of mailing of the international search report

03 AUG 2006

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner of Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (571) 273-3201

Authorized officer

Hoang Dang

Telephone No. 571-272-3600

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/28819

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

PCT/US05/28819

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-7, drawn to a method of manufacturing a tubular member.

Group II, claim(s) 8-23, drawn to a method of manufacturing an expandable tubular member.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The special technical feature of the claims of Group I is the intermediate characteristics of the tubular member when it is positioned within a preexisting structure where it is processed into its final characteristics. The special technical feature of the claims of Group II is the quenching of the tubular member after heat treating so that the tubular member comprises a microstructure comprising a hard phase and a soft phase. The inventions of Groups I and II lack unity because they depend on different technical features.